Commercial vs. Open access: use of e-resources among academics of Engineering Faculties of Sri Lanka

By J. J. G. Arachchige and Ananda Karunarathna

Abstract

Engineering Faculties of Sri Lanka are quite rich with IT facilities and e-culture where a lot of students and academics use the network environment for their scholarly activities. Some faculties have introduced online courses, online tutorials and submission and evaluation of assignments online. The purpose of this article was to explore the information seeking behavior of academics of engineering faculties of Sri Lanka toward the use of electronic resources for their teaching, learning and research needs. The investigation was made to identify the extent of using commercial e- resources and open access e-resources to fulfill their information needs. The methodology occupied in this study was the sample survey, where the samples were selected on cluster basis from academic staff members of engineering faculties of University of Ruhuna, University of Peradeniya and University of Moratuwa. Structured questionnaire was used to gather data from the sample and telephone conversations, e-mail discussions and interviews with the Librarians were made in due circumstances to verify data from the sample. Web pages of the selected libraries were also examined and reviewed in order to ascertain the availability of access points/links to e-resources through their homepages. The results indicate that use electronic resources among academics is high and engineering academics fulfill their information needs mostly though Open Access e-resources than commercial e-resources because access to commercial e-resources is costly and access facilities are limited in the country. Academics obtain commercial e-resources mostly from personal purchasing or from other channels than from the library. Libraries have been unable to provide satisfactory amount of e-resources due to restrictions of funds. It seems that engineering academic poorly use the resources provided under programmes like INASP. Majority of engineering academics do self-searching to locate information from the Internet. Yet, the use of searching mechanisms and tools has been centered on a particular set of popular tools.

Introduction

1.1 Background

The behavioral patterns of using information among academics of universities in the modern day seem to be rather complex and diverse depending on the type of required information, nature of information seeking, availability of infrastructure facilities and the level of information literacy/skills of the user. The rapidly innovative and sophisticated Information Technology has changed the nature of using information and specially the explosive growth of Internet, and availability of Web resources have been much more influential on the process of teaching, learning and research. The emergence of various types and mode of media has made the education more challenging and interesting. Digital resources are comprehensively replacing the conventional print resources at the library while a lot of libraries thrive to

maintain hybrid collections with both print and electronic. Many publishers trend to publish their publications in both formats print and electronic.

Electronic resources are being popular among scholarly communities as its nature of quick accessibility, multiple login 'on-campus' as well as off the campus', and the sophisticated facilities such as hypertext, multiple formats and multimedia associated with them. Electronic publications are seen in various types and formats such as CD ROM databases, DVD ROM databases, online databases, e-books, e-journals, weblogs, Wikis, and institutional e- repositories. The content of e-databases also has been changed shifting from bibliographic mode to full-text mode where the text, graphics, sound, and video are linked to the document online or offline.

Teaching, learning and research in the modern world have become almost imperfect if they not associated with the use of e-resources as most of latest information today is published in the form of e-resources. The internet has become the most dominant information provider while an enormous amount of resources is added to the net every hour as there is no control of the internet. The most challenging issue in this circumstance is to select and filter the relevant information from the net. It is discern that student and staff of the university cannot depend only on self searching. Normally users alone cannot select and retrieve relevant information effectively without the help of the library. A study conducted by Heterick Bruce (2002) in United States reveals that 60% of academics of the faculty were comfortable with electronic resources and 48% of academics are very dependent on the library for their research.

Library's role also has been dramatically changed due to the emergence of sophisticated means of information use. The change of education styles with the networked environment has provoked scholarly communities to seek for quick and instance preferably on the spot access to information. "Modern libraries have evolved from paper-based storehouses of books and journals into distributed network of digitized information and knowledge now known as digital libraries" (Karanjkar 2010). In addition to acquiring paper-based information sources, academic libraries have to conglomerate electronic resources and facilitate users with retrieving, downloading, and accessing to information quickly and easily. It is required to educate and train users to develop their information skills where they are enabled to identify, select, filter, evaluate and synthesize information from the internet.

"Information is accessible from a wide variety of globally distributed commercial repositories such as electronic publishers and aggregators with access charge. However, it is also accessible from open access journals, open access archives, few websites and institutional repositories free of charge. Now libraries can enable world wide access to a never-ending supply of distributed information and knowledge in electronic form that is constantly available, easily updated and convenient to use" (Karanjkar 2010).

Academic libraries today are using various strategies to help their patrons effectively access many electronic resources for their information need. Some of these strategies include:

a. Building digital libraries by converting print mode resources to electronic mode.

b. Purchasing access licenses to commercial databases, e-books and e-journals to the library via direct purchasing or consortia purchasing.
c. Constructing Institutional e-repositories to aggregate digitally born knowledge resources locally by encouraging scholars/authors to self archive or deposit their knowledge products under compulsory or legal deposit policies.
d. Maintain web pages, weblogs, subject gateways, web portals or virtual libraries with creating links to Open-Access e-resources available online or offline.
e. Educate and train users to develop their information literacy skills in order to easily and effectively locate, filter, retrieve and synthesize information from Open-access resources.

However, this should be performed in collaborative basis where librarians, IT personnel and administration work together with the consideration of information seeking behavior of users.

1.2 Purpose

The purpose of this study is to explore the information seeking behavior of academics of engineering faculties of Sri Lanka toward the use of electronic resources for their teaching, learning and research needs. Here it was aimed to investigate whether the engineering academics use electronic resources and the extent of using commercial e- resources and open access e-resources to fulfill their information needs. Attempts were made to identify what are the commercial e-resources they use and how they search for Open access e-resources from the library and internet.

1.3 Methodology

This study occupied a sample survey using the exploratory survey method. Samples were selected on cluster basis from academic staff members of engineering faculties of University of Ruhuna, University of Peradeniya and University of Moratuwa. Engineering faculties were selected as they have a better IT based environment in compared to other faculties of the university and the staff and students of these faculties show much tendency to use digital resources than others. Most of engineering academics have a good knowledge on computer application and the use of Internet as a reference tool for their professional activities. Samples were limited to three departments Electrical Engineering, Mechanical Engineering, and Civil Engineering to ensure the homogeneity of sampling. These departments are commonly available in all faculties of the selected universities. Engineering faculty of the Open University was not selected as the structure and procedures of instructions in that faculty is quite different from other faculties.

The main tool to gather data was the structured questionnaire, which was aimed to gather data related to the types of e-resources, purpose of use, and the way they access to e-resources. The questionnaire was posted/e-mailed directly to the sample and telephone conversations and e-mail discussions were made in due circumstances to verify data from the sample. Interviews were also made with the Librarians of these faculties to refine and reinforce data relevant to the respective libraries. Follow up interviews were made with the sample to refine the data gathered through questionnaire and librarians were contacted over the phone to

ascertain the availability of commercial and open access e-resources through their library. Web pages of the selected libraries were also examined and reviewed in order to ascertain the availability of access points/links to e-resources through their homepages.

Gathered data were analyzed using simple methods like percentage analysis and mean analysis while graphical figures were used to visualize the findings.

1.4. Definitions of terms

E-Resources

E-resources are the information sources available in electronic form. These resources may be published as CD ROMs, DVD ROMs, computer files, or any other digital resource accessible through online or offline. E-journals, e-books, e-databases and Web-blogs are some examples for e-resources. "A library Web-site can function as an information gateway an entry point to a range online resources, with key components being the library catalogue and journal databases" (Johnson, Trabelsi and Tin 2005)

Commercial e-resources

Commercial e-resources are the information sources published or aggregated by a person or organization in the purposes of revenue earning by providing access to the resources. Commercial publishers hold the copyright of the resources and provide access licenses through direct purchase or subscription for a period of time. This can be " virtually any electronic product or service for which libraries spend funds" (Jewell T.D. 2001).

Open access e-resources

Open access e-resources are the information sources which are available in electronic format, accessible online, free of charge and mostly free of copyright. Some of e-resources require registration for licensing. "By 'open access' to this literature we mean its free availability of the public internet, permitting any user to read, download, copy, distribute, print, search or link to the full- text of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal or technical barriers other than those inseparable from gaining access to the internet itself. The only constrain on reproduction and distribution, and the only role for copyright in this domain, should be to give author's control over the integrity of their work and the right to be properly acknowledged and cited" (Budapest Open access Initiative 2002).

1.4 Use of e-resources in Sri Lanka

Use of electronic resources has been highly increased among university academics, researchers and scholars since the last decade in Sri Lanka. Most of universities and academic institutions thrive to develop e-culture in their institutions by developing infrastructure facilities as well as by developing attitudes toward it. Many of teaching and learning modules are being converted into e-formats, and many of administrative and managerial works are becoming associated with e-environment. Several Engineering Faculties have introduced e-learning modules for undergraduates and tutorials can be accessed via intranet. Some

faculties practice the submission of assignments and their evaluation process online in the networked environment and some tests and examinations are also conducted online using the intranet.

Many of universities in the country have quite sufficient internet access facilities with a high band-with, LANs (Large Area Networks), and in some cases Wi-Fi connections to facilitate the community with networked environment.

Many of libraries of universities have automated the circulation, acquisition and housekeeping process and OPACs (Online Public Access Catalogue) have been built up to facilitate users with a bounder-less access to the holdings of the library. In relation to the engineering faculties, some of them have purchased access licenses to commercial e-databases related to engineering disciplines. Journal articles and other e-resources are shared among faculties under Inter Library Loan. Resources are also shared among libraries with the help of social media such as 'Library Friend' e-mail group, and Face book. Faculty libraries have also joined with free access programmes like INASP- PERI, SLJOL and some libraries have joined the programmes of Consortia purchasing of commercial journals and databases.

Several university libraries have initiated to build up Institutional Repositories (IR) so that authors and scholars of the university can self-archive their publication on them. All the Engineering Faculties have a satisfactory amount of Computer Centers to accommodate students to access the Internet and almost all the academic staff members have been provided with a PC or Laptop computer.

As all the government universities are depending on the annually allocated funds by the government, their libraries are receiving insufficient funds to purchase access to commercially published e-resources. has purchased Librarians have to face a lot of difficulties with the gradually deteriorating budget and rapidly increasing prices for books and periodicals. To face this challenge libraries have to strengthen their resource sharing and consortia programmes.

Librarians can also encourage users to seek for open access resources and make them aware of the freely available resources in their respective disciplines. Librarians can take measures to empower their users to find and use open access resources by developing their information skills.

University of Moratuwa has purchased limited access license for several databases ACM Library, Emerald, Grove Art Online, IEE Xplore, ScienceDirect and Scopus with outside funds. Articles from these databases can be shared with other libraries on request.

Covey (2003) reveals several steps that librarians can do what they can to close the gap and remove barriers between commercial vendors and academics, and facilitate convenient, easy access to and use of quality resources. *Redesign the Web sites of the library to improve navigation endeavoring to reduce turnaround times in services, and empowering users with direct browsing tools and tracking mechanisms and marketing the resources to target group*

through portals, provide proxy server or virtual private networks to intercept transactions between users and real servers to address the IP range restrictions by vendors are some of them.

Findings

The aim of this study was to explore the nature of using electronic resources among engineering academics of universities of Sri Lanka and to find out whether they use commercial and Open Access e-resources to fulfill their information needs. Proportionately selected samples from engineering faculties of University of Ruhuna, University of Peradeniya and University of Moratuwa were analyzed using the simple statistical methods such as percentage and mean value analysis in due circumstances.

Interviews with librarians of respective faculties were made to identify the nature of subscription to e-resources, the extent of links available to Open access e-resources through their web pages and the nature of awareness programmes available in their faculties.
Web pages of these libraries were also examined to recognize the facilities available for users to access e-resources.

The questionnaire designed for academics was aimed to gather data related to the types academic activities of respondents, places where they find information to perform their tasks, the purpose of their information seeking, their preference mode of information sources, and the use of commercial e-resources as well as Open Access e-resources for their needs.

It was also examined if the respondents were satisfied with the facilities available in the library to access e-resources. Focus was also given to identify the searching tools of respondents and whether the academics have understood the structure or organization of categories of e-resources available on the Internet. Use of e-resources provided under cooperative programmes /consortia programmes was also examined. The study attempted to identify the search engines and searching mechanisms used by engineering academics and the extent of using selected commercial e-resources and Open Access (OA) resources in the fields of Engineering.

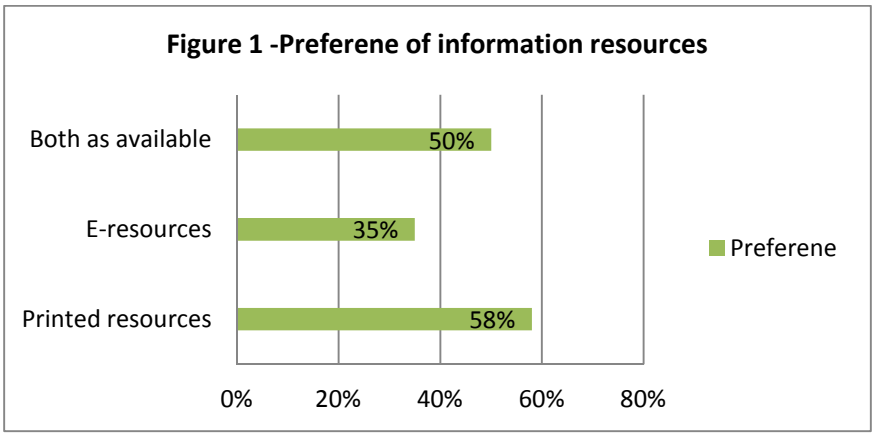
Information is essential for academics to perform tasks related to teaching, learning, research, writing of textbooks, and curriculum planning in their subject areas. According to the study 100% of engineering academics engage in teaching. 91% of them are doing research while 26% of them are engaging in writing textbooks and curriculum designing. This means that they need a lot of information resources related their subject fields.

University community always deals with interpreting and creating of knowledge. Therefore, it is important to knowledge sources are made available for them. This study attempted to investigate where the academics of engineering faculties find information they require. The results indicate that 95% of academics use the Internet for locating information while 5% of respondents use only the library for their information needs. 31% of respondents indicated that they fulfill their information requirement only from the internet searching and personal

collections. Majority of academics use all three channels- the library (73%), personal collection (66%), and the Internet (95%) to find information required for their activities.

Utility of information extends on various purposes. 91% of academics seek for information for preparing teaching materials. 94% of respondents seek for information for their research and studies while 17% of respondents use information for administrative purposes. The rate for recreational purpose is 20% and 2% of academics use information for other purposes.

In relation to the preference of information sources 58% of academics prefer printed resources while 35% of respondents prefer e-resources than printed ones. However, 50% of the academics use both printed and electronic resources depending on the availability to access. This indicates that a large amount of academics still prefer printed sources as they are more comfortable with hard copies (figure 1).



However, adapting to the e-culture 97% of engineering academics use e-resources and 29% of them are mostly relying on commercial e-resources. A satisfactory amount of academics (70%) also seek for information from OA e- resources. This may be due to non availability of access to sufficient amount of commercial e-resources through the library. The practical trend is that the academics use both as availability of them.

Commercial e-resources are obtained by 29% of respondents through their personal purchasing while 23% of respondents get them through the library of the faculty. 47% of respondents find alternatives such as personal contacts, friends groups, social media etc. This indicates that libraries have to find and develop consortia programmes, Inter Library Loans, and other resource sharing activities to cater users with required information. University libraries in Sri Lanka can also launch central purchasing with the help of UGC and provide e-access to all relevant universities.

Users should have searching abilities and skills to locate OA e-resources from the internet. Most of librarians help users with educating them how to find information from the net and how to identify Public Domain Resources from the internet. According to this study 94% of academics obtain OA resources through self-searching. Only 17% of the academics entertain the support of the library.

Formats of e-resources might be different based on the purpose of using and it is very important for a user to be familiar with them to locate relevant OA materials. According to the study, engineering academics search for journal articles (94%), theses/dissertations (64%), course materials (55%), learning objects (20%), data files (20%), audio files (8%), video files (8%) and institutional records (29%). These figures might be different according to the type of faculty, their subject disciplines, course types and the facilities available in the institution.

Librarian of the faculty should have a thorough knowledge on locating relevant resources to support the communities of the faculty. They can set up Resource Links, Subject gateways, and Digital libraries and conduct programmes to make awareness of them among users. An investigation was made by asking respondents whether they are satisfied with the involvement of the library to support them to find e-resources. The responses revealed that 80% of academics are not satisfied with the facilities available at the library to locate e-resources. Only 11% of academics indicated that facilities at the library are sufficient. Yet 35% of the respondents had no idea of it. Satisfaction may be different according to the university, and the balance of the subject coverage of library collections. For example 80% of respondents of Moratuwa University expressed that the facilities available at the library are sufficient. However, these statistics imply that librarians should take measures to increase the accessibility to e-resources and make a balanced collection of e-resources at the library.

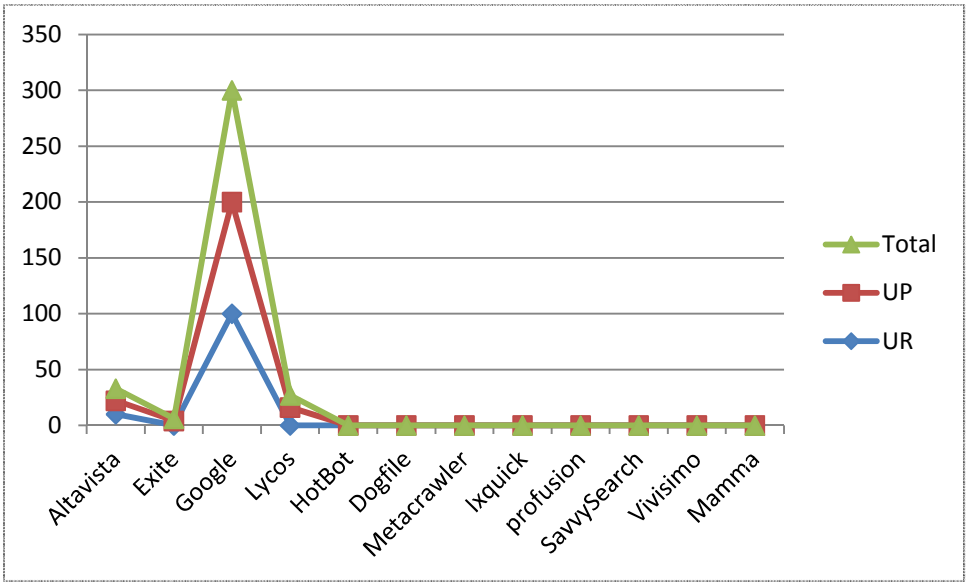
Information available in the Internet is organized under various categories with different structures and procedures. The understanding of these categories might be much helpful for users to locate and retrieve information effectively. According to this study 41% of engineering academics access to Digital Libraries constructed by various institutions. 47% of respondents access to e-databases to find their information while 38% of respondents use Institutional e-repositories to locate information needed. The rate of using personal websites is 41% and the majority of academics (64%) search for e-books. No one was found familiar with Listserv. 20% of respondents access to weblogs, and only 2% of academics use 'RSS feeds' to find information.
Wikis are the types of information sources which provide background information of a concept in a wide range. 29% of academics obtain their information through 'Discussion Groups' and the percentage of respondents using Wikis was 47. 'Subject- gateways' are a mechanism to aggregate e-resources virtually under one discipline and provide links to them on the internet. These are very important for scholars and researchers as they are often based on particular subjects. However, only 8% of engineering academics search Subject gateways to locate their information. Scholars can communicate information via P2P file sharing networks and the rate for using that facility was 2%.

INASP (International Network for the Availability of Scientific Publications) is a programme to provide access to international scholarly literature, and has been contributed by many of librarians in Sri Lanka to provide scholarly information to users free of charge. This project provides access facilities to selected commercial e-resources and OA databases in order to improve the availability of information in developing countries. Majority of university libraries have set up links with this facility. This study involved the exploration of using e-

resources provided under INASP programme. According to the study 14% of respondents use this facility to find their information. Several databases were used by academics as follows: National Library of Sweden (11%), Elsevier (47%), and Springer (38%).

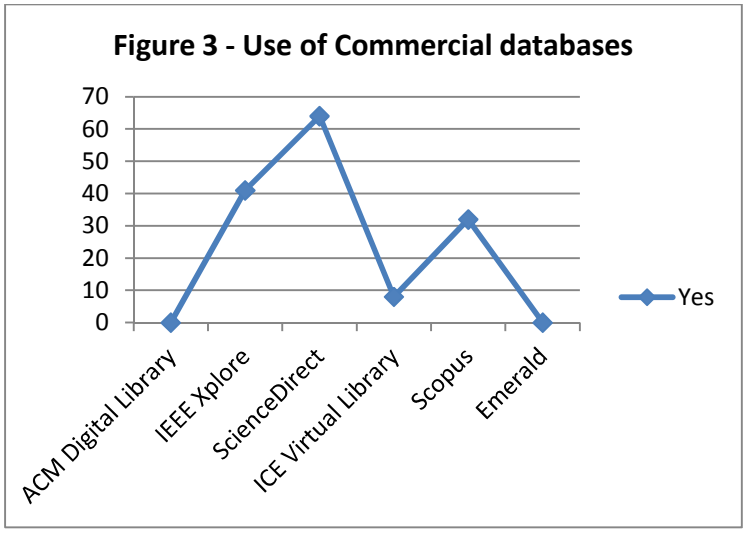
The process of searching and retrieving of information can vary according the search engine used to navigate the Internet. This study attempted to identify the search engines used by engineering academics to locate their information. According to the study all the respondents use Google (100%) to locate information. 'AltaVista' is used by 11% of them while Excite (2%) and Lycos (11%) are used by a few people (Figure 2). The results indicate that most of academics relying on popular search engines such as Google and not interested in other search engines due to lack of knowledge or unawareness of their different capacity and facilities. Nobody of them used search engines like **HotBot**, Dogpile, Metacrawler, Ixquick, Profusion, SavvySearch, Vivisimo, Mamma or any other.

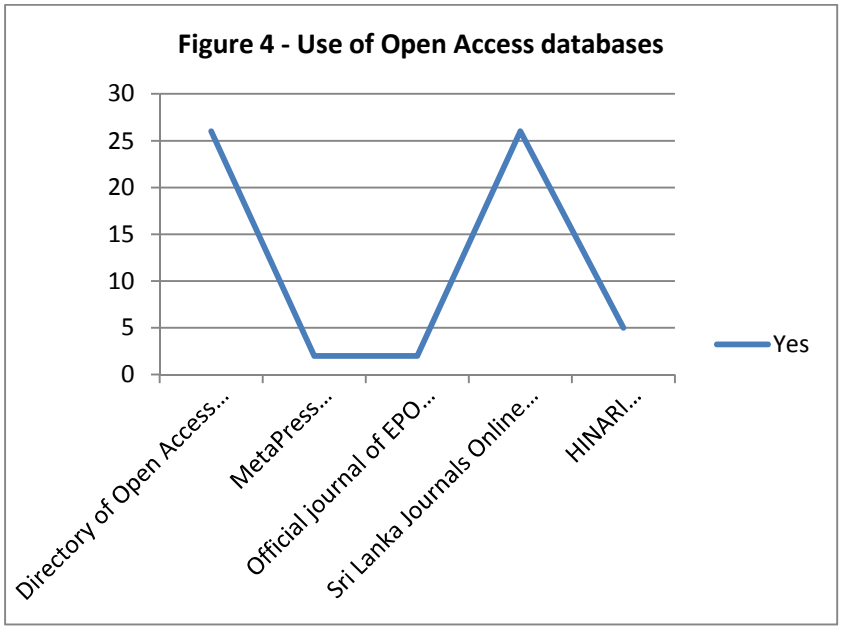
Figure 2 – Use of search engines to locate information



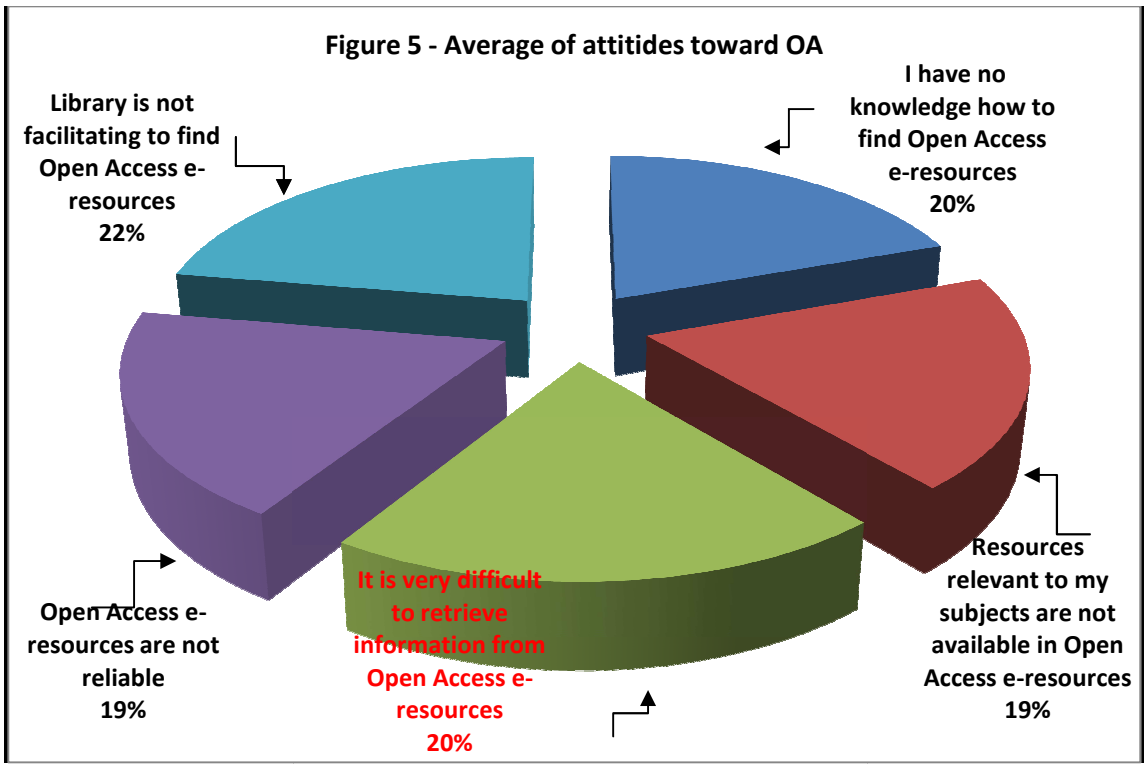
Journals are very important for teachers and researchers as the they communicate the most newest knowledge in the field. This study examined the use of selected commercial journals in Civil, Mechanical and Electrical engineering fields and the result shows that the use of electronic journals was very low.

Exploration was also made to measure the use of selected commercial databases and OA databases. The highest rate of respondents used 'ScienceDirect' (64%) and 'Scopus' was used by 32% of respondents (Figure 3). In relation to the OA databases, most academics used DOAJ and SLJO. However, majority seem to be not aware of them. (Figure 4 indicates the details.





Tendency to use Open Access e-resources among engineering academics seems to be high because of the non availability to sufficient amount of commercial e-resources purchased to the university. The study involved the testing of attitudes toward the use of OA resources among them. Here the points such as the ability to find out OA resources, relevancy of OA resources to their subject areas, accessibility and reliability of OA resources, and the facilities available at the library to locate OA e-resources were examined. The highest opinion in this regard was that library is not facilitating to find open access e-resources (mean score 20.4). Some academics (20%) also believe that they have no good knowledge on finding OA resources and it is very difficult to retrieve relevant information from OA resources.19.% of respondents believe that OA resources are not reliable and most of OA resources are not relevant to their subjects. Figure 5 visualizes the details.



Homepages of respective three libraries (Ruhuna, Peradeniya, and Moratuwa) were examined in order to identify the links available to access e-resources. Homepage of the University of Ruhuna Library had setup links to Electronic Resources under the sub-themes of *E-journals, Databases, Current periodical contents, e-books, Newspapers, Subject gateways, CD ROM*s, Online Journals, Fultext Journals on CDs, and Free Online Journals. Yet some of them were under construction and most of free journals were not supportive to the Engineering curriculum of the faculty.

University of Peradeniya library Homepage had links to 'Electronic resources' under the categories of Databases, INASP/PERI resources, Free resources, Other websites, E-resources in branch libraries. Most of links were failed to logon and subject coverage of linked resources were not related to the Engineering curriculum.

University of Moratuwa Library Homepage had links under the heading of E-Resources. Connections to *ACM Digital Library, Emerald, Grove Art Online, IEEE Xplore, ScienceDirect and Scopus* were found. Yet, the searches were limited to abstract and bibliographic information. Passwords were required to logon to full-text resources and therefore, access was failed. They have either obtained password protected login or they have not purchased the access license. According to the interviews with librarians University of Ruhuna and Peradeniya have not purchased access license to commercial e-resources and the University of Moratuwa had purchased access license to a number of above mentioned e-databases. However, it was a limited access to selected e-resources.

Conclusion

Tendency to use electronic resources among academics of engineering faculties of Sri Lanka is high, although a quite considerable amount of academics prefer to use printed mode

information sources. Engineering academics fulfill their information needs mostly though Open Access e-resources than commercial e-resources because access to commercial e-resources is costly and access facilities are limited in the country. Academics obtain commercial e-resources mostly from personal purchasing or from other channels than from the library. Libraries have been unable to provide satisfactory amount of e-resources due to restrictions of funds and librarians tend to go for consortia and resource sharing programmes to face this problem. It seems that engineering academic poorly use the resources provided under programmes like INASP. The librarians also attempt to encourage users find information through Open Access by setting links on web-pages and conducting information literacy programmes to develop awareness among users. Majority of engineering academics do self-searching to locate information from the Internet. Yet, the use of searching mechanisms and tools has been centered on a particular set of popular tools. Librarians might arrange programmes to develop their awareness on various mechanisms and their benefits. Open access e-resources are used by academics as an alternative to commercial e-resources.

Reference list

Budapest Open access Initiative (BOAI). 2002. Budapest Open Access Initiative (Frequently Asked Questions) [online] (updated September 13, 2011) Available at: http://www.earlham.edu/~peters/fos/boaifaq.htm#background [Accessed 8 December, 2011).

Covey, T. D.2003. The need to improve remote access to online library resources: filling the gap between commercial vendor and academic user practice. Carnegie Melton University. 2003. Available at http://works.bepress.com/egi/viewcontent.cgi?article=1037&context=den: [Accessed December 09, 2011].

Heterick, B. 2002. Faculty attitudes toward electronic resources. Educause review (July/August. 2002. Available at http://net.educause.edulir.library/pdf/ERMO248.pdf/ [Accessed 12 December, 2011]

Homepage of University of Moratuwa. http://www.lib.mrt.ac.lk [Accessed 17 December, 2011]

Homepage of University of Peradeniya. http://www.lib.pdn.ac.lk [Accessed 17 December, 2011]

Homepage of University of Ruhuna. http://www.lib.ruh.ac.lk [Accessed 17 December, 2011]

Jewel, T.D. 2001. Selection and presentation of commercially available electronic resources: issues and practices. Council on Library and Information Resources. Available at http://www.clir.org/pubs/reports/pub99/contents.html Accessed 29 November, 2011.

Johnson, K., Trabelsi, H., & Tin, T. 2005. Library support for online learners: e-resources, e-services and human factors In: : Athabasca University. n.d.. *Theory and practice of online learning [e-book]* Available through: Athabasca University <htto:// cdc. Athabascau.ca/online_book/ch 14.htm> [Accessed 7 December, 2011].

Karajkar, N.S. 2010. Use of open access e-resources for management users. In: IMDR Institute of Management Development and Research. Available at

http://www.imdr.edu/Use%20of%20Open%20Access%20E%20Resources.html [accessed 30 November, 2011]